Workshop instructor Peter Xiques was one of several speakers at the 2010 High School Physics Teachers Workshop, which attracts physics, chemistry and physical science teachers from across the country.

Physics teachers learn new tricks at INL workshop

By Brianna McNall, *INL Nuclear Science & Technology Communications intern*

It started with fun physics tricks that could be done at home, and moved on to cool things to put in a microwave.

By the end of the discussion, everyone in the room knew that marshmallows can be used to calculate the speed of light, that glow sticks mix to create color combinations that would stump the most open-minded art student, and that quinine and black lights make everything "two steps cooler."

Since 2006, INL has sponsored the Physics Teachers Workshop to help educators share ideas for enlivening science lessons.

Since it began in 2006, the annual National High School Physics Teacher Workshop hosted by Idaho National Laboratory has attracted physics, chemistry and physical science teachers from across the country. Over the course of a week, the teachers who come to Idaho Falls for this workshop listen to presentations from experts in nuclear energy, next generation reactors, waste management and alternative energy solutions. The educators exchange activity ideas and participate in hands-on experiments that they can take back to their districts and classrooms to share with students. The teachers even get a chance to tour the INL Site and get a first-hand look at its ongoing research.

This year 40 teachers participated. They learned about coated particle fuel and saw a film on storage container testing that they all wanted copies of, certain that high school students would love seeing the huge containers smashed by trucks, dropped, rolled and set on fire. Even with the Jefferson wildland fire that cut the INL Site tour short, the wind that nearly blew everyone off their feet, and the shortage of chocolate cake at dinner, the teachers were enthusiastic as they shared their ideas and stories about the labs they do with students.

As state funding for education is cut, teachers have to come up with innovative, inexpensive ways to teach students about physics. Mini marshmallows, quinine, glasses, glow sticks — things that can be found at the local dollar or drug store are the new tools of high school physics labs.

Workshop instructor and retired INL employee Bob Skinner watches as teachers Vicki Davis, Steve Millam and Alyson Palmer use a geiger counter to measure radiation.

With teachers from Hawaii to Maine and everywhere in between, a wide range of schools was represented at the workshop. Some were schools with little or no lab equipment and few textbooks. Others came from districts with more funding, or had written successful grants that enabled them to provide a smart board in every classroom, new computers and top-of-the-line lab equipment. The teachers specialized in different subjects as well. Among the sciences taught by this year's group was earth science, physical science, physics and chemistry.

Although each teacher came from a different school and a different situation, all were looking for answers to the same questions: How can we get our students interested in science? How can we teach them about energy solutions in a changing world?

This year's theme was Nuclear Technology: Enabling Global Energy Security. Despite the fact that the technology for using nuclear reactors to generate electricity has been around since 1951, nuclear energy is not a common topic in high school physics texts.

At the INL workshop, the teachers received information on advances in nuclear technology, and some grounding in the basics of nuclear energy, nuclear reactors and the different forms of renewable energy. Each of the teachers selected to participate in the workshop will take the information they learned home to share with other teachers in their district and around their state. The idea is that this information will allow teachers to be more confident in their discussion of a variety of energy forms, including nuclear energy.

The INL Site tour takes teachers through INL's Advanced Test Reactor, which several teachers said was a great source of inspiration.

"I am thinking about how my students could develop a gamma and materials experiment to be tested with the ATR lab," said Karen Elliot, a physics teacher from Reston, Va.

Teachers at the workshop also received a box with some equipment to add to their classrooms — this year their boxes included a radiation detection device known as a Geiger counter, a piece of old orange Fiestaware (the kind with the radioactive glaze), several small radioactive sources and a new data-collection interface. For several of the teachers, especially those who come from schools with limited resources, this was the best part.

Teachers Emily Sherman and Karen Elliot learn to illustrate the half-life of radioactive materials using M&M's.

"I plan to make [nuclear energy] hands-on instead of just reading, watching videos and working problems," said Patti Howell, a teacher from Americus, Ga.

The last full day of the workshop was dedicated to hands-on experiments using their new equipment.
A Geiger counter was clicking away at one of the back tables.

"Nuts have a lot of radioactivity," said Mississippi teacher Sharon Davis, sitting at the table. "That's why it clicks a lot around me, because I'm really nutty."

Nutty or not, high school teachers speak to and influence thousands of students over the course of their careers. The teachers who come to this workshop will be able to share their knowledge with the next generation — or possibly the next several generations — of scientists and engineers.

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